

Handbook of Research on Healthcare Administration and Management

Nilmini Wickramasinghe

Epworth HealthCare, Australia & Deakin University, Australia

A volume in the Advances in Healthcare
Information Systems and Administration (AHISA)
Book Series



www.igi-global.com

Published in the United States of America by

IGI Global

Medical Information Science Reference (an imprint of IGI Global)

701 E. Chocolate Avenue

Hershey PA, USA 17033

Tel: 717-533-8845

Fax: 717-533-8661

E-mail: cust@igi-global.com

Web site: <http://www.igi-global.com>

Copyright © 2017 by IGI Global. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher. Product or company names used in this set are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark.

Library of Congress Cataloging-in-Publication Data

Names: Wickramasinghe, Nilmini, editor.

Title: Handbook of research on healthcare administration and management /
Nilmini Wickramasinghe, editor.

Description: Hershey PA : Medical Information Science Reference, [2017] |
Includes bibliographical references and index.

Identifiers: LCCN 2016032783 | ISBN 9781522509202 (hardcover) | ISBN
9781522509219 (ebook)

Subjects: | MESH: Health Services Research--trends | Health Services
Administration | Medical Informatics Applications | Process Assessment
(Health Care)

Classification: LCC RA971 | NLM W 84.3 | DDC 362.1068--dc23 LC record available at <https://lcn.loc.gov/2016032783>

This book is published in the IGI Global book series Advances in Healthcare Information Systems and Administration (AHISA) (ISSN: 2328-1243; eISSN: 2328-126X)

British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: eresources@igi-global.com.

Chapter 21

Social Forces that Influence Health IT Use Behavior of the Elderly

Karoly Bozan

Idaho State University, USA

Bill Davey

RMIT University, Australia

Kevin R Parker

Idaho State University, USA

ABSTRACT

The social forces that influence patient portal use behavior among the elderly are not well understood. Using both institutional theory and the Unified Theory of Acceptance and Use of Technology, the proposed model examines three social environmental factors – normative, mimetic, and coercive forces – within a Health Information Technology (HIT) context. An empirical study involving 117 subjects in the United States was used to test the proposed model. Using the partial least squares method, mimetic and coercive pressures were found to significantly influence patient portal use behavior. These findings indicate that older people follow not only their providers' advice, but also follow the behavior of respected, higher-status peers from their network. Normative pressure was not found to be significant, implying that older people do not follow the bandwagon effect.

INTRODUCTION

The healthcare industry is paying greater attention to improving patient outcomes through better provider-patient communication (Tang et al., 2013; Chrischilles et al., 2014). One such tool that is seeing greater utilization by healthcare providers is the patient portal. Patient portals are secure online websites that allow patients to access their personal health information, such as communicate summaries of recent visits, medications, immunizations, allergies, and lab results, from any location with an Internet connec-

DOI: 10.4018/978-1-5225-0920-2.ch021

tion (Krist et al., 2012; HealthIT.gov). More sophisticated patient portals are also capable of scheduling non-urgent appointments, downloading and submitting forms, processing prescription refills, accepting payments, and providing viewable educational material (Goldzweig et al., 2013). Patient portals have become a valuable tool for addressing the problem of rapidly aging populations in most countries (Bierman, 2012).

The use of electronic health records (EHR) is also on the rise. A 2014 study (Hsiao & Hing, 2014) shows that about 80% of office-based physicians in the US use EHRs, and a majority of them (69%) are committed to participate in the meaningful use incentive payment program available in the United States (Blumenthal & Tavenner, 2010). One of the Stage 2 Core Set objectives to achieve meaningful is “provide patients the ability to view online, download, and transmit their health information” (HealthIT.gov). This means that healthcare providers with EHR systems are mandated to provide patients with access to personal health information over the Internet using a secure online portal. Several other countries are introducing similar initiatives as they try to both improve health outcomes and strive for efficiencies in their health systems (Wickramasinghe, Davey, & Tatnall, 2013).

Numerous studies examine patient portal acceptance and use (Goldzweig et al., 2013; Ancker et al., 2011; Smith et al., 2015; Sarkar et al., 2011; Goel et al., 2011; Jung et al., 2011; Weppner et al., 2010). Patients with chronic conditions are more likely to accept and use patient portals (Goldzweig et al., 2013; Ancker et al., 2011; Millard & Fintak, 2002). Patient age is negatively correlated with portal adoption and use, especially among older patients (Goel et al., 2011; Jung, Padman, Shevchik, et al., 2011; Weppner et al., 2010). Roughly 20% of the US population will be over the age of 65 by 2030 in the next decade due to longer life spans and aging baby boomers (CDC, 2013), and it has been established that doctor visits and medical spending increase during the final years of life (Hogan, Lunney, Gabel, & Lynn, 2001). In fact, some studies indicate a quarter of an individual’s medical spending occurs in their final year (Lubitz & Riley, 1993). Hence, one can conclude that while older patients could benefit most from patient portals, they are the least likely group to use them.

While there exists a number of empirical studies that examine various factors to better understand consumer health information technology (CHIT) acceptance and use, they rely primarily on technology acceptance theories (Klein, 2007). The variety of antecedents in the competing models show that older patients are less likely to accept CHIT by making use of online health information because of less comfort, efficacy, and control (Smith et al., 2015; Or & Karsh, 2009). However, one of these antecedents is social influence, also called subjective norm (Ajzen, 1991; Venkatesh & Davis, 2000; Moore & Benbasat, 1991), which remains unexplored in regards to older patients. According to Carley and Kaufer (1993), elderly patients are likely to conform to the attitudes, norms, and beliefs of those around them, meaning that social influence may be a motivator for the elderly to adopt and use patient portals. It is therefore prudent to examine social influence in more detail beyond the technology acceptance theories.

This empirical study argues that elderly patients’ opinions about patient portal acceptance and use are influenced by those peers they respect. The conceptual model proposed herein is based on institutional theory’s driving forces as a precursor of the driving forces of behavioral intention and use behavior within the Unified Theory of Acceptance and Use of Technology (UTAUT) Model. Data collected from the elderly in various social settings provides the basis of our empirical evidence that normative, coercive, and mimetic social forces significantly influence older patients’ use behavior toward patient portals.

BACKGROUND

Two major determinants drive technology acceptance and use: individual beliefs and social factors. “Subjective norm” is the term commonly used to describe the social pressure to engage in an activity (Fishbein & Ajzen, 1975). An individual develops beliefs shaped by a motivation to comply with the perception of how influential peers or superiors think they should or should not perform (Fishbein, 1980). In the technology domain, influencers in the form of respected peers or superiors are found to be a strong determinant in shaping beliefs (Mathieson, 1991; Taylor & Todd, 1995). This study does not explore or hypothesize any relationship among the individual beliefs or social factors, but rather approaches the social factors from the basis of institutional theory.

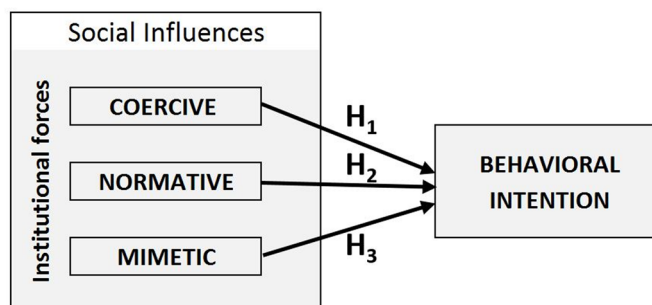
Technology use by individuals has been explored by examining the characteristics of both individuals and organizations. Institutional characteristics have been found to strongly influence technology use (Delone, 1988; Sanders & Courtney, 1985; Boynton, Zmud, & Jacobs, 1994). While institutional theory was developed and applied in an organizational context (Liang, Saraf, Hu, & Xue, 2007; Ang & Cummings, 1997; DiMaggio & Powell, 1983), organizations actually operate at the local, interpersonal relationships level through a network of individuals (Scott, 2001). Hence, this study will empirically investigate the effect of the social factors of institutional theory on patient portal use by the elderly, and will expand the theory’s applicability through theoretical and managerial implications.

MAIN FOCUS OF THE ARTICLE

Social Forces as Precursor of Portal Use

In order to better account for the ways in which institutional forces influence patient portal use behavior by the elderly, this study presents the conceptual model shown in Figure 1, based on institutional theory (DiMaggio & Powell, 1983) and the UTAUT model (Venkatesh, Morris, Davis, & Davis, 2003). Although social forces are a major precursor in almost all major technology acceptance models, none of them have investigated social forces on a more granular level (Bozan, Davey, & Parker, 2015). Early studies of institutional theory identified three mechanisms, coercive pressure, normative pressure, and mimetic pressure, which promote structure and process similarities (DiMaggio & Powell, 1983; Scott, 2001). This study examines whether those three institutional forces significantly affect use behavior among older users.

Figure 1. Conceptual model



MODEL COMPONENTS

Use Behavior

For the purposes of this study, use behavior is defined as the degree to which a user regularly uses the system for the purposes it is designed. The most common dependent variables in technology acceptance literature are actual use, intention to use, and behavior. Behavior is defined as a specific or general action whose prediction is of interest in a particular model (Ajzen & Driver, 1991; Ajzen & Fishbein, 1980). In the “competing” technology acceptance models, the dependent variable is often preceded by the subjective norm, which is an individual’s perception of influencers’ approval or disapproval of the specific or general target behavior. The antecedents of use behavior are often linked to the subjective norm or social influence, hence our choice for the dependent variable of use behavior in our proposed conceptual model.

Coercive Pressure

Coercive pressure includes both the formal and informal pressures on an individual (social actor) by a more powerful individual (actor) to adopt the same practices, behaviors, or attitudes (DiMaggio & Powell, 1983). Formal or informal coercive pressure at the organizational level can be generated by a variety of sources, such as regulatory agencies, customers, suppliers, and other powerful actors (Teo, Wei, & Benbasat, 2003).

In the context of healthcare, regulatory pressure often impacts many facets of care at the individual level. Since this study is focusing on patient portal acceptance, the pressure that providers may put on patients to use patient portals is investigated. For example, physicians are powerful actors in the physician-patient relationship, and may informally pressure patients to access their portal for health-related communication in order to increase the effectiveness of care. Hence, it is hypothesized:

H1: Patients who perceive higher coercive pressure are more likely to use a patient portal.

Normative Pressure

Institutional theory posits that if an action, behavior, or belief is exhibited by an adequately large group of actors, a social actor is more likely to copy that action. Copying is not mandated and may not even be conscious, but rather becomes the norm, the “right” way (Harcourt, Lam, & Harcourt, 2005; Johnson, Dowd, & Ridgeway, 2006). When normative pressure acts as a social factor for adopting a behavior or belief, it can result in discord if peers whose opinions are valued are already using an innovation (DiMaggio & Powell, 1983; Van den Bulte & Lilien, 2001). Therefore, following the behavior, using the innovation, becomes an obvious and “right” choice for the social actor.

Older patients supported by a large network may often share details about their physical health with each other. During such discussions, if a respected peer mentions the use of patient portals, other individuals are more likely to consider trying one out. This effect has been described generally by Abrahamson (1991) as theories of fads. Hence, it is posited:

H2: Patients who perceive higher normative pressure are more likely to use a patient portal.

Mimetic Pressure

DiMaggio and Powell (1983) proposed mimetic pressure as the conscious and voluntary act of copying the behaviors of those with higher status and success. Such copying behavior is driven by the belief that the actions of more successful and respected actors result in positive outcomes. The assumption is that copying the behavior of respected members of a network is safer than experimenting new, “untested” behavior (Teo, Wei, & Benbasat, 2003). Seniors are often more aware of their health status because they more actively seek information about their health (Bennenbroek, Buunk, van der Zee, & Grol, 2002). If a trusted friend mentions their patient portal as being a reliable source of information, those who have not adopted a portal are more likely will try using it. Therefore, it is hypothesized:

H3: Patients who perceive higher mimetic pressure are more likely to use a patient portal.

RESEARCH METHODOLOGIES

Measurement

Questionnaire items were adopted from the literature for social forces (Liang et al., 2007; Teo, Wei, & Benbasat, 2003; Jan, Lu, & Chou, 2012) and use behavior (Venkatesh et al., 2003; Liu, Wu, & Sun, 2014). Social factors constructs were measured by six indicators, while the dependent variable was measured by three indicators. (Please see Appendix for the Questionnaire Items and indicators)

Data Collection

Convenience and snowball sampling was used for data collection. Several assisted living establishments were contacted and asked to promote our survey among their residents. The survey was also disseminated among a network of elderly individuals who were asked to share it with their contacts. 117 fully completed questionnaires were returned prior to data analysis.

Control Variables

Demographic variables, such as age and gender, have been found to have significant effect on social behavior studies (Mazman, 2011; Dabaj, 2009). Morris and Venkatesh (2000) found that older individuals are more susceptible to social influences, but a study by Botwinick (1973) indicates they are more cautious before they decide on an action. Women are found to be more perceptive regarding others’ opinions than men (Venkatesh et al., 2003). Our study also controls for residence, since dwelling in an assisted living environment may have an effect on social factors as opposed to those who are somewhat more isolated in their residence (Cattan, White, Bond, & Learmouth, 2005; Nicholson, 2008). In addition, technical efficacy (Chaffin & Harlow, 2005; Purdie & Boulton-Lewis, 2003) and attitude toward self-health (Karwalajtys et al., 2005) were also examined for their effect on use behavior.

DATA ANALYSIS AND RESULTS

Instrument Validation

The Partial Least Squares (PLS) statistical method was used for scales validity assessment and hypotheses testing because it provides more flexibility with sample size and residual distribution (Anderson & Gerbing, 1988; Chin, Marcolin, & Newsted, 2003; Chin, 1998). Using the most recent version of SmartPLS (version 3.2.1 for Windows 64 bit), the relationships between constructs (path coefficients) and the predictive power of the dependent variable – R-squared (Chin, 1998) is examined.

Table 1 presents the measurement model t-statistics and factor loadings. Factor loadings of less than 0.7 have been removed to strengthen the item reliability. Since reflective indicators are interchangeable (meaning they ask the same thing), some can be omitted and PLS is flexible and reliable even with a low number of factors per latent variables (Wold, 1985), therefore the factors loaded less than 0.7 can be safely removed. Construct reliability was tested by Cronbach’s Alpha and the results were above the recommended 0.7 value (Nunnally, 1978). Convergent validity values, in terms of average variance extracted (AVE), were above the recommended 0.5 value (Fornell & Larcker, 1981).

Hypotheses Testing

Our measurement model was tested against the hypotheses through path coefficients (relationship strength between IV and DV) and R-squared values to measure the predictive power of the model (Barclay, Higgins, & Thomson, 1995). T-statistics were calculated using the bootstrapping technique in SmartPLS.

The path coefficients from coercive pressure to use behavior ($b=0.24$, $p<0.05$) and from mimetic pressure to patient portal use behavior ($b = 0.351$, $p<0.001$) supported hypothesis 1 and 2 respectively, indicating that coercive and mimetic forces have a significant effect on the adoption and use of patient portals among the elderly. However, normative pressure showed no significant impact on patient portal use behavior ($b=0.11$, NS).

The research model explains 28% of the variance of social forces on patient portal use behavior as indicated by the r-squared value. This magnitude is somewhat expected as technology adoption and use behavior is a cumbersome subject with numerous antecedents. This study focuses on social factors and intentionally omitted other, well established constructs. Therefore, the predictive power of the model was expected to be on the lower side.

Control variables showed an insignificant effect on patient portal use behavior with path coefficients of $b= 0.04$, -0.07 , -0.05 , 0.03 respectively for attitude toward self-health, gender, resident type, and technical affinity respectively.

Table 1. Factor loadings, t-statistic and Cronbach’s Alpha for the measurement model

Construct	Loading	t-Statistic	Cronbach’s Alpha
Coercive	0.24**	2.93	0.71
Normative	0.11	1.31	0.78
Mimetic	0.35**	4.83	0.80

**t-Statistics are significant on the 0.01 level.

SOLUTIONS AND RECOMMENDATIONS

This study examined the effect of social factors on patient portal adoption and use behavior among the elderly. The conceptual model was constructed on institutional theory and UTAUT. With the adoption and use of patient portals by the elderly serving as the dependent variable, this study empirically tested the strength of the effects of three independent variables, namely coercive, normative, and mimetic pressures.

The study revealed theoretical and practical findings. First, both coercive and mimetic forces have a significant effect on the adoption and use of patient portals among the elderly. One of the main coercive forces on elderly patients is their providers; older patients follow the advice of their medical provider. With regard to mimetic forces, it became apparent that higher profile, respected peers influence the elderly with regard to patient portal adoption. Mimetic pressure has a stronger influence than normative pressure; satisfied portal users will have a stronger effect on other elderly patients to adopt and use patient portals. Normative pressure, however, has an insignificant effect on use behavior, which is a significant finding of this study. It indicates that elderly people do not follow the bandwagon effect. They have established practices, which may only change if a respected, higher status actor from their network suggests it.

The low effects of the control variables are also important findings as a more general approach is sufficient to reach the elderly to the same extent.

FUTURE RESEARCH DIRECTIONS

While this study makes a contribution to the relevant literature and provides valuable directions, it has limitations that may affect the generalizability of the findings. Data collection followed convenience and snowballing sampling. Geographical distribution was not tracked and the results may only represent that of a particular area. Also, the subjects were mostly contacted through email and social media and the survey was conducted online, in effect requiring that every respondent have a basic level of familiarity with the Internet and computers.

It is important to keep in mind that most of the variables (72%) in use behavior remain unexplained by the variance in the measurement model, which implies that there could be a number of other factors that may influence adoption and usage of patient portals by the elderly. This provides the opportunity for future research to enhance the model to examine other important social factors that may strengthen the predictive power of the model.

It might be informative to investigate a similar model with behavioral intention as the mediator between social factors and use behavior, similar to UTAUT. Since this study investigates social factors on a more granular level, one may wonder whether or not all three institutional forces are significant with the moderator or only with the dependent variable.

CONCLUSION

This study serves to extend the literature on patient portal use, as use behavior of the elderly has not been previously investigated with respect to social forces. The application of institutional theory as the pillar of our model, accompanied by significant findings, adds to the growing literature on the adoption and usage of information and communication technologies in healthcare by the elderly. Additional fac-

tors have been identified for health communication technology adoption by the elderly population, and promise to lead to future research that can reveal additional important social factors that may strengthen the predictive power of the model.

REFERENCES

- Abrahamson, E. (1991). Managerial fads and fashions: The diffusion and rejection of innovations. *Academy of Management Review*, *16*(3), 586–612.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. doi:10.1016/0749-5978(91)90020-T
- Ajzen, I., & Driver, B. L. (1991). Prediction of leisure participation from behavioural, normative, and control beliefs: An application of the theory of planned behavior. *Leisure Sciences*, *13*(3), 185–204. doi:10.1080/01490409109513137
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Ancker, J. S., Barrón, Y., Rockoff, M. L., Hauser, D., Pichardo, M., Szerencsy, A., & Calman, N. (2011). Use of an electronic patient portal among disadvantaged populations. *Journal of General Internal Medicine*, *26*(10), 1117–1123. doi:10.1007/s11606-011-1749-y PMID:21647748
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423. doi:10.1037/0033-2909.103.3.411
- Ang, S., & Cummings, L. L. (1997). Strategic response to institutional influences on information systems outsourcing. *Organization Science*, *8*(3), 235–256. doi:10.1287/orsc.8.3.235
- Barclay, D., Higgins, C., & Thomson, R. (1995). The partial least squares approach to causal modeling, personal computer adoption and use as an illustration. *Technology Studies*, *2*(2), 285–309.
- Bennenbroek, F. T., Buunk, B. P., van der Zee, K. I., & Grol, B. (2002). Social comparison and patient information: What do cancer patients want? *Patient Education and Counseling*, *47*(1), 5–12. doi:10.1016/S0738-3991(02)00018-6 PMID:12023095
- Bierman, A. S. (2012). Averting an impending storm: Can we reengineer health systems to meet the needs of aging populations? *PLoS Medicine*, *9*(7), e1001267. doi:10.1371/journal.pmed.1001267 PMID:22815655
- Blumenthal, D., & Tavenner, M. (2010). The ‘Meaningful Use’ regulation for electronic health records. *The New England Journal of Medicine*, *363*(6), 501–504. doi:10.1056/NEJMp1006114 PMID:20647183
- Botwinick, J. (1973). *Aging and behavior*. New York: Springer.
- Boynton, A. C., Zmud, R. W., & Jacobs, G. C. (1994). The influence of IT management practice on IT use in large organizations. *Management Information Systems Quarterly*, *18*(3), 299–318. doi:10.2307/249620

Social Forces that Influence Health IT Use Behavior of the Elderly

Bozan, K., Davey, B., & Parker, K. R. (2015). Social influence on health IT adoption patterns of the elderly: An institutional theory based use behavior approach. *Procedia Computer Science*, *63*, 517–523. doi:10.1016/j.procs.2015.08.378

Carley, K. M., & Kaufer, D. S. (1993). Semantic connectivity: An approach for analyzing symbols in semantic networks. *Communication Theory*, *3*(3), 183–213. doi:10.1111/j.1468-2885.1993.tb00070.x

Cattan, M., White, M., Bond, J., & Learmouth, A. (2005). Preventing social isolation and loneliness among older people: A systematic review of health promotion interventions. *Ageing and Society*, *25*(1), 41–67. doi:10.1017/S0144686X04002594

Centers for Disease Control and Prevention (CDC). (2013). The state of aging and health in America 2013. Atlanta, GA: Centers for Disease Control and Prevention, US Dept. of Health and Human Services. Retrieved from http://www.cdc.gov/features/agingandhealth/state_of_aging_and_health_in_america_2013.pdf

Chaffin, A. J., & Harlow, S. D. (2005). Cognitive learning applied to older adult learners and technology. *Educational Gerontology*, *3*(4), 301–329. doi:10.1080/03601270590916803

Chin, W. W. (1998). Issues and opinion on structural equation modeling. *Management Information Systems Quarterly*, *22*(1), vii–xvi.

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information Systems Research*, *14*(2), 189–217. doi:10.1287/isre.14.2.189.16018

Chrischilles, E. A., Hourcade, J. P., Doucette, W., Eichmann, D., Gryzlak, B., Lorentzen, R., & Levy, B. et al. (2014). Personal health records: A randomized trial of effects on elder medication safety. *Journal of the American Medical Informatics Association*, *21*(4), 679–686. doi:10.1136/amiajnl-2013-002284 PMID:24326536

Dabaj, F. (2009). The role of gender and age on students' perceptions towards online education case study: Sakarya University, Vocational High School. *The Turkish Online Journal of Educational Technology*, *8*(2), 120–123.

Delone, W. H. (1988). Determinants of success for computer usage in small business. *Management Information Systems Quarterly*, *12*(1), 51–61. doi:10.2307/248803

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism in organizational fields. *American Sociological Review*, *48*, 147–160. doi:10.2307/2095101

Fishbein, M. (1980). A theory of reasoned action: Some applications and implications. In H. Howe & M. Page (Eds.), *Proceedings of the Nebraska Symposium on Motivation* (pp. 65-116). Lincoln, NE: University of Nebraska Press.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *JMR, Journal of Marketing Research*, 18(1), 39–50. doi:10.2307/3151312
- Goel, M., Brown, T., Williams, A., Hasnain-Wynia, R., Thompson, J., & Baker, D. (2011). Disparities in enrollment and use of an electronic patient portal. *Journal of General Internal Medicine*, 26(10), 1112–1116. doi:10.1007/s11606-011-1728-3 PMID:21538166
- Goldzweiq, C. L., Orshansky, G., Paiqe, N. M., Towfiqh, A. A., Haqqstrom, D. A., & Miake-Lye, I. et al.. (2013). Electronic patient portals: evidence on health outcomes, satisfaction, efficiency, and attitudes: a systematic review. *Annals of Internal Medicine*, 159(10), 677–687. doi:10.7326/0003-4819-159-10-201311190-00006 PMID:24247673
- Harcourt, M., Lam, H., & Harcourt, S. (2005). Discriminatory practices in hiring: Institutional and rational economic perspectives. *International Journal of Human Resource Management*, 16(11), 2113–2132. doi:10.1080/09585190500315125
- Hogan, C., Lunney, J., Gabel, J., & Lynn, J. (2001). Medicare beneficiaries' cost of care in the last year of life. *Health Affairs*, 20(4), 189–195. doi:10.1377/hlthaff.20.4.188 PMID:11463076
- Hsiao, C. J., & Hing, E. (2014). Use and characteristics of electronic health record systems among office-based physician practices: United States, 2001–2013. *NCHS data brief, no 143*. National Center for Health Statistics. Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db143.htm>
- Jan, P. T., Lu, H. P., & Chou, T. C. (2012). The adoption of e-learning: An institutional theory perspective. *The Turkish Online Journal of Education Technology*, 11(3), 326–343.
- Johnson, C., Dowd, T. J., & Ridgeway, C. L. (2006). Legitimacy as a social process. *Annual Review of Sociology*, 32(1), 53–78. doi:10.1146/annurev.soc.32.061604.123101
- Jung, C., Padman, R., Shevchik, G., & Paone, S. (2011). Who are portal users vs. early e-visit adopters? A preliminary analysis. *Proceedings of the AMIA Annual Symposium*(pp. 1070–1079).
- Karwalajtys, T., Kaczorowski, J., Chambers, L., Levitt, C., Dolovich, L., & McDonough, B. et al.. (2005). A randomized trial of mail vs. telephone invitation to a community-based cardiovascular health awareness program for older family practice patients. *BMC Family Practice*, 2005, 6–35. PMID:16111487
- Klein, R. (2007). An empirical examination of patient-physician portal acceptance. *European Journal of Information Systems*, 16(Suppl. 6), 751–760. doi:10.1057/palgrave.ejis.3000719
- Krist, A. H., Woolf, S. H., Rothemich, S. F., Johnson, R. E., Peele, J. E., Cunningham, T. D., & Matzke, G. R. et al. (2012). Interactive preventive health record to enhance delivery of recommended care: A randomized trial. *Annals of Family Medicine*, 10(4), 312–319. doi:10.1370/afm.1383 PMID:22778119
- Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of enterprise systems: The effect of institutional pressures and the mediating role of top management. *Management Information Systems Quarterly*, 31(1), 59–87.
- Liu, Y., Wu, M., & Sun, Z. (2014). Extending the TAM model to explore the factors that affect Intention to Use digital textbooks in primary teachers' views. In *Intelligent Environments* (pp. 127-136).

Social Forces that Influence Health IT Use Behavior of the Elderly

- Lubitz, J. D., & Riley, G. F. (1993). Trends in medicare payments in the last year of life. *The New England Journal of Medicine*, 328(15), 1092–1096. doi:10.1056/NEJM199304153281506 PMID:8455667
- Mathieson, K. (1991). Predicting user intentions: Comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, 2(3), 173–191. doi:10.1287/isre.2.3.173
- Mazman, S. G. (2011). Gender differences in using social networks. *The Turkish Online Journal of Educational Technology*, 10(2), 133–139.
- Millard, R. W., & Fintak, P. A. (2002). Use of the Internet by patients with chronic illness. *Disease Management & Health Outcomes*, 10(3), 187–194. doi:10.2165/00115677-200210030-00006
- Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192–222. doi:10.1287/isre.2.3.192
- Morris, M. G., & Venkatesh, V. (2000). Age differences in technology adoption decisions: Implications for a changing workforce. *Personnel Psychology*, 3(2), 375–403. doi:10.1111/j.1744-6570.2000.tb00206.x
- Nicholson, N. R. Jr. (2008). Social isolation in older adults: An evolutionary concept analysis. *Journal of Advanced Nursing*, 65(6), 342–352. PMID:19291185
- Nunnally, J. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.
- Or, C. K., & Karsh, B. T. (2009). A systematic review of patient acceptance of consumer health information technology. *Journal of the American Medical Informatics Association*, 16(4), 550–560. doi:10.1197/jamia.M2888 PMID:19390112
- Purdie, N., & Boulton-Lewis, G. (2003). The learning needs of older adults. *Educational Gerontology*, 29(2), 129–149. doi:10.1080/713844281
- Sanders, G. L., & Courtney, J. F. (1985). A field study of organizational factors influencing DSS success. *Management Information Systems Quarterly*, 9(1), 77–91. doi:10.2307/249275
- Sarkar, U., Karter, A. J., Liu, J. Y., Adler, N. E., Nguyen, R., López, A., & Schillinger, D. (2010). Social disparities in Internet patient portal use in diabetes: Evidence that the digital divide extends beyond access. *Journal of the American Medical Informatics Association*, 18(3), 318–321. doi:10.1136/jamia.2010.006015 PMID:21262921
- Scott, W. R. (2001). *Institutions and organizations* (2nd ed.). Thousand Oaks, CA: Sage.
- Smith, S. G., O’Conor, R., Aitken, W., Curtis, L. M., Wolf, M. S., & Goel, M. S. (2015). Disparities in registration and use of an online patient portal among older adults: Findings from the LitCog cohort. *Journal of the American Medical Informatics Association*, 22(4), 888–895. doi:10.1093/jamia/ocv025 PMID:25914099
- Tang, P. C., Overhage, J. M., Chan, A. S., Brown, N. L., Aghighi, B., Entwistle, M. P., & Young, C. Y. et al. (2013). Online disease management of diabetes: Engaging and motivating patients online with enhanced resources-diabetes (EMPOWER-D), a randomized controlled trial. *Journal of the American Medical Informatics Association*, 20(3), 526–534. doi:10.1136/amiajnl-2012-001263 PMID:23171659

- Taylor, S., & Todd, P. A. (1995). Assessing IT usage: The role of prior experience. *Management Information Systems Quarterly*, 19(4), 561–570. doi:10.2307/249633
- Teo, H. H., Wei, K. K., & Benbasat, I. (2003). Predicting intention to adopt interorganizational linkages: An institutional perspective. *Management Information Systems Quarterly*, 27(1), 19–49.
- Van den Bulte, C., & Lilien, G. L. (2001). Medical innovation revisited: Social contagion versus marketing effort. *American Journal of Sociology*, 106(5), 1409–1435. doi:10.1086/320819
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186–204. doi:10.1287/mnsc.46.2.186.11926
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *Management Information Systems Quarterly*, 27(3), 425–478.
- Weppner, W. G., Ralston, J. D., Koepsell, T. D., Grothaus, L. C., Reid, R. J., Jordan, L., & Larson, E. B. (2010). Use of a shared medical record with secure messaging by older patients with diabetes. *Diabetes Care*, 33(11), 2314–2319. doi:10.2337/dc10-1124 PMID:20739686
- Wickramasinghe, N., Davey, B., & Tatnall, A. (2013). Web 2.0 panacea or placebo for superior healthcare delivery? In R. Bali, I. Troshani, S. Goldberg, & N. Wickramasinghe (Eds.), *Pervasive health knowledge management* (pp. 317–330). New York: Springer. doi:10.1007/978-1-4614-4514-2_23
- Wold, H. (1985). Partial least squares. In S. Kotz & N. L. Johnson (Eds.), *Encyclopedia of statistical sciences* (pp. 581–591). New York: Wiley.

KEY TERMS AND DEFINITIONS

Elderly Citizens: People over the age of 65 years.

Health IT Adoption: Healthcare information technology (Health IT) is the use of computer applications to record, store, protect, retrieve, and transfer clinical, administrative, and financial information electronically within and among various health care settings. (www.hrsa.org). Adoption of Health IT for the purposes of this research is defined as the process from being aware of the technology to the effective and efficient usage for the intended purpose.

Health IT Usage: Accessing personal health information by the intended recipient through electronic medium and application designed for informational or decision making reason purpose.

Institutional Theory: In this paper, Institutional Theory is defined as the guidelines for social behavior in the form of accepted structures, schemas, rules, norms, and routines influenced by other members of the collective network of actors.

Unified Theory of Acceptance and Use of Technology (UTAUT): The UTAUT model explains Technology use intention and behavior with numerous constructs including social influence.

APPENDIX

Questionnaire Items

(Strongly Disagree =1, Strongly Agree =7)

Coercive Pressure (Adopted from Teo, et al., 2003; Liang, et al., 2007; Jan, et al., 2012)

- Q1:** I trust the diagnosis and treatment my physician prescribes.
- Q2:** My physician strongly encourages me to use and understand information on an Online Personal Health Information website.
- Q3:** I understand that information related to my condition can be found on an Online Personal Health Information website.
- Q4:** Interaction with my physician requires me to access an Online Personal Health Information website.
- Q5:** Is your physician the only person who controls your treatment? If not who else do you go to for help and how much help do you get from them? (Do not use an actual name, rather please describe the person's role or your relation to this person)
- Q6:** Who is the most important person you go to for health advice outside your physician and why do you trust their advice? (Do not use an actual name, rather please describe the person's role or your relation to this person)

Normative Pressure (Adopted from Teo, et al., 2003; Liang, et al., 2007; Jan, et al., 2012)

- Q1:** I am aware that some of my close family or friends are regularly accessing their Online Personal Health Information website.
- Q2:** Those who use their Online Personal Health Information website would help me to access an Online Personal Health Information website if I asked for it.
- Q3:** People around me believe that it is beneficial to access their Online Personal Health Information website.
- Q4:** I feel that I would be better informed if I used an Online Personal Health Information website.
- Q6:** What new technology have you used in the last few years? E.g. do you use the internet, do you have a tablet or portable computer, do you use your mobile phone for more than phone calls?

Mimetic Pressure (Adopted from Teo, et al., 2003; Liang, et al., 2007; Jan, et al., 2012)

- Q1:** My close friends who regularly access their Online Personal Health Information website have benefited from it.
- Q2:** My close friends who regularly access their Online Personal Health Information website are more respected for taking charge of their health.
- Q3:** I feel that I would be favorably perceived if I used an Online Personal Health Information website.

Q4: I feel motivated to find more information about my condition.

Q5: If everyone near me were to use an Online Personal Health Information website, it would influence me to try it.

Use Behavior (Adopted from Venkatesh, et al., 2003, Liu, et al., 2010,)

Q1: I plan to access an Online Personal Health Information website in the next year for the first time.

Q2: I plan to access an Online Personal Health Information website regularly.

Q3: I plan to continue using an Online Personal Health Information website.

Controls

Q1: I live in:

- My own home
- A retirement village
- In a nursing home

Q2: I am very good with technology:

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Q3: My age is:

- Under 65
- Over 65

Q4: I am:

- Male
- Female

Q5: Having good information about the state of my health and any conditions is important to me.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Q6: I have used the internet for health advice.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree

Social Forces that Influence Health IT Use Behavior of the Elderly

Q7: I ask other people to find health advice on the internet.

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree